

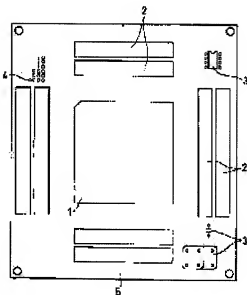
**PATENT ABSTRACTS OF JAPAN**(11)Publication number : **10-341063** ✓(43)Date of publication of application : **22.12.1998**

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**H05K 1/02**(21)Application number : **09-149443**(71)Applicant : **SHASHIN KAGAKU:KK**(22)Date of filing : **06.06.1997**(72)Inventor : **MIZUO MANABU  
SHIBATA ETSUJI  
YAMAMOTO YASUHEI****(54) PRINTED CIRCUIT BOARD****(57)Abstract:**

**PROBLEM TO BE SOLVED:** To provide a general-purpose printed circuit board which allows its circuit wiring to be changed, in addition to the change of FPGA.

**SOLUTION:** This board has a printed circuit board body 5 having an array region 1 capable of mounting at least a field programmable gate array and a connector region 2 capable of connecting at least two connectors provided with a peripheral region 3 capable of mounting peripheral circuits for ICs, etc., at the body 5, and the array region 1, connector region and peripheral region 3 are selectively connectable electrically.

**LEGAL STATUS**

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CLAIMS

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[Claim(s)]

[Claim 1] field-programmable gate array field (1) in which the field-programmable gate array of a piece can be laid at least Connector field in which at least two connectors can be laid (2) Printed circuit board body (5) It is the prepared printed circuit board. Boundary region which can carry circumference circuits, such as IC, in said printed circuit board body (3) It is prepared. And said field-programmable gate array field (1) Connector field (2) Boundary region (3) Printed circuit board characterized by coming it possible to carry out electrical installation alternatively.

[Claim 2] Said field-programmable gate array field (1) Printed circuit board according to claim 1 which can direct lay a field-programmable gate array.

[Claim 3] Said field-programmable gate array field (1) Other printed circuit boards are minded for a field-programmable gate array, and it is the printed circuit board according to claim 1 which can be laid.

[Claim 4] Said connector field (2) Printed circuit board given in any of claims 1-3 they are loading of a connector of is enabled at a front face and the rear face.

[Claim 5] said printed circuit board body (5) two or more small substrates (7) and (7) ... disengageable -- at least -- this small substrate (7) of a piece Said field-programmable gate array field (1) Boundary region (3) Connector field (2) Printed circuit board given in any of claims 1-4 prepared they are.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a printed circuit board. It is related with a printed circuit board usable to a performance test etc. in more detail.

[0002]

[Description of the Prior Art] In recent years, for IC, it changes and a field-programmable gate array (henceforth FPGA) is used for various kinds of circuits. This FPGA can change the output of FPGA, when a user changes the internal circuitry of FPGA with an external instrument with external instruments, such as a personal computer, since it is the integrated circuit which can change an internal circuitry. Therefore, a user can get different output characteristics by not changing wiring of a printed circuit board but changing the output of FPGA.

[0003]

[Problem(s) to be Solved by the Invention] The range which can change that by which said FPGA can change an internal circuitry with external instruments, such as a personal computer, as mentioned above is limited, and when a user changes only the internal circuitry of FPGA to the printed circuit board of one sheet, obtaining a desired function has the problem of being actually difficult.

[0004] This invention makes it a technical problem to offer the flexible printed circuit board which was made in order to solve the above troubles, and can make a wiring change of a circuit in addition to modification of FPGA.

[0005]

[Means for Solving the Problem] The printed circuit board concerning this invention made in order to solve the above-mentioned technical problem field-programmable gate array field 1 according to claim 1 in which the field-programmable gate array of a piece can be laid [ like and ] at least Connector field 2 in which at least two connectors can be laid Printed circuit board body 5 It is the prepared printed circuit board. Said printed circuit board body 5 The boundary region 3 in which circumference circuits, such as IC, can be carried is formed, and it is said field-programmable gate array field 1. Connector field 2 Boundary region 3 It is characterized by coming it possible to carry out electrical installation alternatively.

[0006] Thus, field-programmable gate array field 1 Connector field 2 Boundary region 3 By making electrical installation possible alternatively, a user can choose a required part and can connect.

[0007] Here, a circumference circuit is a concept not only containing circuits, such as IC and a clock circuit, but resistance, a capacitor, etc.

[0008] The printed circuit board concerning this invention is like and said field-programmable gate array field 1 according to claim 2. Since electric resistance with a field-programmable gate array and the printed circuit board body 5 becomes small, it is desirable for direct installation of a field-programmable gate array to be possible.

[0009] The printed circuit board concerning this invention is like and said field-programmable gate array field 1 according to claim 3. It is the printed circuit board body 5 about various field-programmable gate

arrays for a field-programmable gate array to be laid through other printed circuit boards. Since it can lay, it is desirable.

[0010] The printed circuit board concerning this invention is like and said connector field 2 according to claim 4. It is the printed circuit board body 5 to enable loading of a connector at a front face and the rear face. It can connect in the vertical direction, therefore is the printed circuit board body 5. Since the distance of a between can be kept short, it is desirable.

[0011] the printed circuit board concerning this invention -- like and said printed circuit board body 5 according to claim 5 two or more small substrates 7 and 7 ... disengageable -- at least -- this small substrate 7 of a piece Said field-programmable gate array field 1 Boundary region 3 Connector field 2 being prepared -- the small substrates 7 and 7 after separation -- since ... can be connected combining a surrounding circuit, therefore the versatility of a printed circuit board spreads, it is desirable.

[0012]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing. Drawing 1 shows the outline top view of the gestalt of 1 operation of the printed circuit board of this invention.

[0013] It sets to drawing 1 and is 1. The FPGA field where the required part was wired beforehand is shown so that FPGA can be carried directly, and it is 2. The connector field where the required part was wired that a connector should be carried is shown, and it is 3. For example, the boundary region wired that a clock circuit should be carried is shown. in addition, said FPGA field 1 and the connector field 2 And boundary region 3 \*\*\*\* -- a user can wire, respectively -- as -- through holes 4 and 4 ... prepares -- having -- \*\*\*\* -- said FPGA field 1 and connector field 2 And boundary region 3 from -- printed circuit board body 5 It is constituted.

[0014] It is the FPGA field 1 about predetermined FPGA in case the printed circuit board formed as mentioned above is used. It is a boundary region 3 in a circumference circuit required in order to carry and to perform a performance test, for example, IC etc. It carries and is the FPGA field 1. Boundary region 3 Through holes 4 and 4 It connects electrically with wiring. Moreover, the need is accepted and it is the connector field 2. A connector can be carried and the output of FPGA can be outputted outside.

[0015] Thus, to the printed circuit board body of one sheet, if the printed circuit board of this invention is used, when a user changes external wiring, the performance test of a desired circuit can be performed. Therefore, the effectiveness that reduction of development cost can be aimed at is acquired.

[0016] Moreover, it is the FPGA field 1 about FPGA like \*\*\*\*. In order to attach direct picking, it is the printed circuit board body 5. Electric resistance becomes small. Therefore, in case a performance test is carried out, the operating characteristic of FPGA can be examined more correctly.

[0017] The printed circuit board in the gestalt of above-mentioned operation should be corresponded to BUS specification in part.

[0018] Moreover, it sets in the gestalt of above-mentioned operation, and is the immediate printing substrate body 5 about FPGA. It is the printed circuit board body 5 so that attaching may be possible. The printed circuit board which starts this invention although it wired is the printed circuit board body 5 about the printed circuit board in which FPGA was carried beforehand, without being limited to \*\*\*\*. You may wire so that it can attach.

[0019] Printed circuit board body 5 in which FPGA was beforehand carried like \*\*\*\* It is the printed circuit board body 5 about other different printed circuit boards. By attaching, the class of FPGA cannot be asked but FPGA can be carried in a printed circuit board body through other printed circuit boards.

[0020] Furthermore, in the gestalt of above-mentioned operation, although the example in which a clock circuit is carried in a boundary region was explained, the boundary region is wired, without being limited to a clock circuit so that various circumference circuits, such as IC, resistance, and a capacitor, can be carried.

[0021] Drawing 2 shows the outline top view of the gestalt of other operations of a printed circuit board. Connector field 2 for [ of the small substrate which makes the printed circuit board body of one sheet disengageable to two or more small substrates, and may be separated in the gestalt of this operation ] installing two connectors in a piece at least FPGA field 1 whose two-piece loading of FPGA is enabled

Boundary region 3 for enabling loading of circumference circuits, such as IC, It is characterized by being prepared.

[0022] In addition, the gestalt of this operation is shown in drawing 2 -- as -- printed circuit board body 5 an abbreviation center section -- and the longitudinal direction of drawing 2 -- printed circuit board body 5 Cutting slot 6 formed in the crevice for making cutting easy it prepares -- having -- \*\*\*\* -- cutting slot 6 each cut part -- small substrate 7 \*\* -- it carries out.

[0023] It is shown in drawing 2 -- as -- one small substrate 7 (small substrate located in the drawing 2 bottom) -- this small substrate 7 The field 11 in which the programmable device which achieves the duty of switching prepared in the abbreviation center section can be carried, and connector field 2 in which two connectors can be carried Boundary region 3 in which circumference circuits, such as IC and a clock circuit, can be carried from -- it is constituted.

[0024] Moreover, FPGA field 1 which carries FPGA in the small substrate 7 of another side (small substrate located in the drawing 2 bottom) Two pieces are prepared and the boundary region 3 is established in the both ends of the longitudinal direction of drawing 2 . Furthermore, small substrate 7 of said another side It sets and is the connector field 2 which can carry two connectors in the end section of the lengthwise direction of drawing 2 . It is prepared.

[0025] Thus, one small substrate 7 FPGA field 1 Boundary region 3 Connector field 2 Since it has, in case it is used, it is the printed circuit board body 5. Cutting slot 6 Small substrate 7 after dissociating By connecting a connector, it is the small substrate 7. It can connect with other printed circuit boards, and can use. Thus, by connecting again using a connector, the separated small substrate can be used like separation before.

[0026] As mentioned above, according to the gestalt of this operation, it is the printed circuit board body 5. Since it can combine variously and can use by dissociating, it is the printed circuit board body 5. It can use more nearly general-purpose.

[0027] According to the above-mentioned operation gestalt, it is the cutting slot 6. Although carried out to one, a cutting slot is made or more into two, and it is the cutting slot 6. It is the FPGA field 1 to a piece at least among the small substrates which may be separated. Boundary region 3 Connector field 2 A printed circuit board can also be constituted so that it may be prepared.

[0028] Moreover, in the gestalt of this operation, although two-piece loading of FPGA was enabled, the number of FPGA is not limited to this, but is good also as a piece or three or more piece loading being possible.

[0029] Without being limited to the gestalt of above-mentioned operation, the connector field concerning this invention may be constituted so that a connector can be carried from the front face of a printed circuit board, and both sides on the back, for example.

[0030] Thus, printed circuit board body 5 in which required components were carried as shown in drawing 3 when the connector could be carried from the front face of a connector field, and both sides on the back Two or more comrades are connectable in the vertical direction. Therefore, it is not necessary to make the distance between the loading parts of the components which do not need a superficial location and are carried in the printed circuit board body able to estrange too much, and the signal delay generated among components can be reduced.

[0031] Moreover, without being limited to the gestalt of each above-mentioned operation, the number of the connectors prepared in a connector field may be three or more, and should just also have at least one number of FPGA prepared in an FPGA field.

[0032]

[Effect of the Invention] According to the printed circuit board concerning this invention, by preparing the boundary region which can carry circumference circuits, such as IC, in a printed circuit board body, and making possible alternatively electrical installation of a field-programmable gate array field, a connector field, and a boundary region, a user can choose a required part, and can wire and connect. Therefore, to the printed circuit board body of one sheet, when a user changes external wiring, the performance test of a desired circuit can be performed. The effectiveness that reduction of development cost can be aimed at is acquired.

[0033] If direct installation of a field-programmable gate array is possible for said field-programmable gate array field according to the printed circuit board concerning this invention, electric resistance with a field-programmable gate array and a printed circuit board body will become small. Therefore, the operating characteristic of a field-programmable gate array is more detectable to accuracy.

[0034] According to the printed circuit board concerning this invention, if said field-programmable gate array field can be laid through other printed circuit boards in a field-programmable gate array, it can lay various field-programmable gate arrays in a printed circuit board body.

[0035] According to the printed circuit board concerning this invention, loading of a connector being possible, then a printed circuit board body can be connected to the front face and rear face of said connector field in the vertical direction, therefore the connection distance between printed circuit board bodies can be kept short. Therefore, since the distance between the components carried in a printed circuit board body is small, the effectiveness that the signal delay between components can be reduced is acquired.

[0036] If according to the printed circuit board concerning this invention said printed circuit board body is disengageable to two or more small substrates, this small substrate is alike, respectively and said field-programmable gate array field, boundary region, and connector field are prepared, the small substrate after separation can be connected combining a surrounding circuit, therefore the versatility of a printed circuit board will spread.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The outline top view showing the gestalt of 1 operation of the printed circuit board of this invention.

[Drawing 2] The outline top view showing the gestalt of other operations of the printed circuit board of this invention.

[Drawing 3] The perspective view showing the busy condition of the printed circuit board of this invention.

[Description of Notations]

- 1 FPGA Field
- 2 Connector Field
- 3 Boundary Region
- 5 Printed Circuit Board Body

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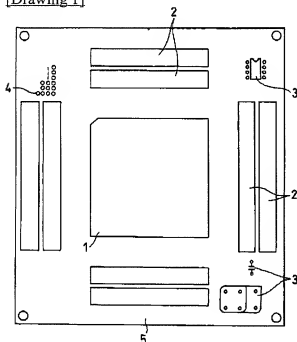
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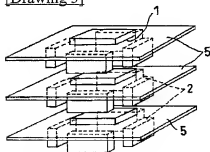
DRAWINGS

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[Drawing 1]



[Drawing 3]



[Drawing 2]

